

[From the PROCEEDINGS OF THE ZOOLOGICAL SOCIETY OF LONDON,
1914.]

[Published December 1914.]

Contributions to the Anatomy and Systematic Arrangement of the Cestoidea. By FRANK E. BEDDARD, M.A., D.Sc., F.R.S., F.Z.S., Prosector to the Society.

(Text-figures 1-9.)

XV. ON A NEW GENUS AND SPECIES OF THE FAMILY ACOLEIDÆ.

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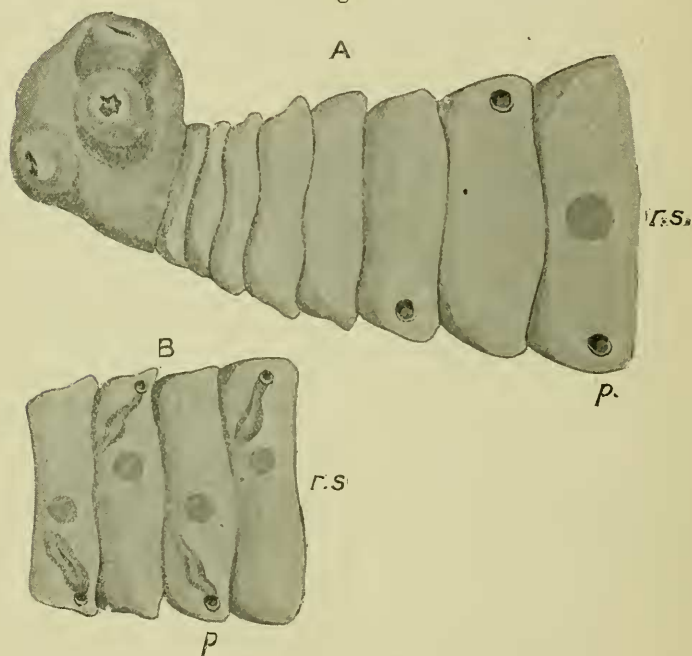
I obtained a large number of examples of this new Tapeworm from a specimen of the Canadian Tree-Porcupine, *Erethizon dorsatum*, which died in the Society's Gardens on May 14. From the comparatively short time which the host had lived in the Gardens (one year and two months) it would seem to be very possible that it was infected with the parasite before arriving in London, and that this Cestode is therefore an American and not a European genus or species. On the other hand, there are no facts which would render the opposite view untenable. But little is known of the longevity of these worms in their final hosts. To the naked eye, or after an inspection with a hand-lens, there is nothing remarkable in the worm, which, however, shows on a more profound anatomical examination to present several features of interest, of which the most important is the great reduction of the female efferent organs. This feature would seem to place it in the family Acoleidæ; but the systematic position will be considered after the structure has been gone into.

This species is medium sized, the examples reaching a length of 50 to 60 mm., or perhaps a trifle more; the greatest breadth is not more than just over 3 mm. When alive, the scolex end of the worm swayed about with considerable vivacity, which I have not observed to be generally the case among tapeworms, the movements being, as a rule, slower.

The segments are flat and thin, and at the end of the body get to be rather translucent. This lack of the usual white appearance is not, however, due to sterility; the very last segment in such examples as I examined, by means of sections, was gravid. The *scolex* is very distinct, though the body widens immediately after it. There are no hooks of any kind upon either the rostellum or the suckers. There is, in fact, no rostellum; the suckers are fairly large and conspicuous. Under examination with a lens, the neck appeared to be quite absent and the segmentation to commence at once. There is, however, as may be seen in longitudinal sections, a very short neck where no segments

are to be observed. In the strobila region the segments are at first very narrow; but they increase in length posteriorly, though never reaching a greater length than diameter. The hinder margins on either side project in the more mature segments over the following segment. The last segment of the body was often to be seen; it was narrower and a trifle longer than those immediately preceding it and somewhat oval in form. As already remarked, this segment did not prove to be sterile.

Text-figure 1.

*Monacocestus crethizontis.*

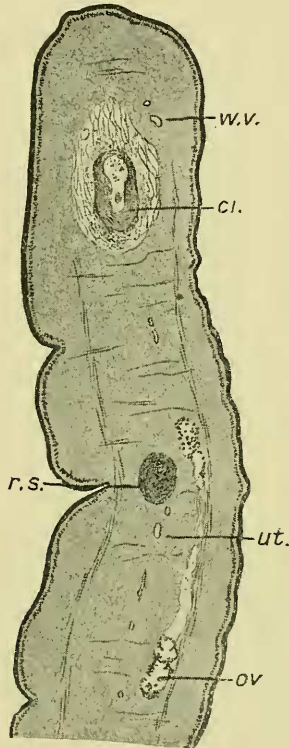
- A. General view of scolex and anterior proglottids.
 B. A few anterior proglottids, illustrating relative positions of receptaculum seminis and cirrus-sac.

p. Genital pore. r.s. Receptaculum seminis.

The *genital pores* alternate with rigid regularity from side to side of the body. The cirrus was frequently seen to be protruded, and very often an oval body bearing the cirrus also projected from the side; on making sections this body proved not to be the protruded cirrus-sac as might have been anticipated, but that sac surrounded by a certain part of the medullary tissue which together formed a marked bulge upon the side of the segment.

These are the only external characters to be noticed in this worm, whose identity or systematic position, as is obvious, could not be thereby determined. The flatness and thinness of the strobila is emphasised by transverse sections. In such, the fact may be observed that the cortex is of less diameter than the medulla. As is usual, the two layers of parenchyma are separated by a layer of transverse muscles, which is, in the present species,

Text-figure 2.

*Monæcocestus erethizontis.*

Part of a transverse section through a ripe proglottid.

ci. Cirrus-sac. *ov.* Ovary. *r.s.* Receptaculum seminis. *ut.* Uterus.
w.v. Water-vascular vessels.

a thin one. So, too, are the longitudinal muscles, which are nowhere massed into bundles. They lie singly, but in several rows; nor is their arrangement regular. Thus the muscular system is altogether slight, and contrasts in this with various members of the family Acoleidæ. The muscular fibres themselves are slender,

and it is not a little unusual to find that the abundant dorso-ventral fibres are of stouter build, and thus much more conspicuous in a transverse section. Calcareous bodies are numerous in this species, and are to be found throughout the body both in the cortex and the medulla.

The *water-vascular system* consists of the usual four longitudinal trunks, of which the ventral are connected by the usual transverse vessels in each segment. Both in transverse and horizontal sections it can be observed that the two trunks of each side of the body are placed as nearly as possible side by side. The outermost of the two vessels, however, is slightly to one side, that is to say, it is, being the dorsal vessel, slightly dorsal in position of the ventral tube. It is well known that the relative positions of the dorsal and ventral tubes when lying side by side differ, being in some species arranged precisely in the reverse fashion to others. In the present worm the dorsal vessel lies to the outside, as I presume from the fact that the outer vessel is not the one which is connected with its fellow by the transverse vessel in each segment, and from the fact that it is from time to time much narrower in calibre than the inner ventral vessel. Often, however, the two vessels are of the same size. The transverse tubes lie in the middle of the medulla, and at the end of the segment. The inner longitudinal vessel bends inwards to give off the transverse vessel, which thus forms a Y-like angle. I could discover no trace of any network connected with any of the main trunks. Such a network exists in the family Acoleidæ, and is referred to by Fuhrmann* in *Shipleya inermis*.

Genital Organs.

A peculiarity of this species—which, however, it shares with a good many Cestodes—is the early development of the genital organs. It agrees, for instance, with *Schizotenia americana* (to accept v. Janicki's identification of Stiles's species †) in this feature, a point which must be borne in mind in comparing the two. I recognised in longitudinal horizontal sections considerable traces of the genitalia in the fourth segment, and I would not like to assert the absence of still more undifferentiated beginnings in an earlier segment. In the sixth segment the cirrus-sac was fairly developed and the sperm-duct obvious; and in the sixth segment I saw for the first time a perfectly clear circular external pore. This was seen in a specimen mounted entire in glycerine, and it agrees with another specimen which I examined by sections. There were pores in all the segments posterior to the sixth. I have already mentioned the absolute regularity of the alternation of the genital pores from right to left side. The earliest segment in which the genitalia appeared to be quite functional was the ninth, in which I observed the

* Rev. Suisse Zool. xvi. 1908, p. 70.

† Proc. U.S. Nat. Mus. xix. 1897, p. 165.

receptaculum to be full of sperm. Neither the testes nor the ova were ripe so early in the body.

The *testes* lie posteriorly in the segment just in front of the transverse water-vascular vessel. They form a narrow band running right across each segment, but contained within the area bounded by the lateral water-vascular trunks.

It may be seen in transverse and horizontal sections that the testes are not more than two deep and are in three or four rows. There are about 60-70 in each segment. I regard the testes as dorsal in position, because when the outer and dorsal water-vascular trunk moves away from its lateral position with reference to the inner tube, it lies to the side corresponding to that on which lie the testes. They are therefore dorsal, and the ovary is ventral in position.

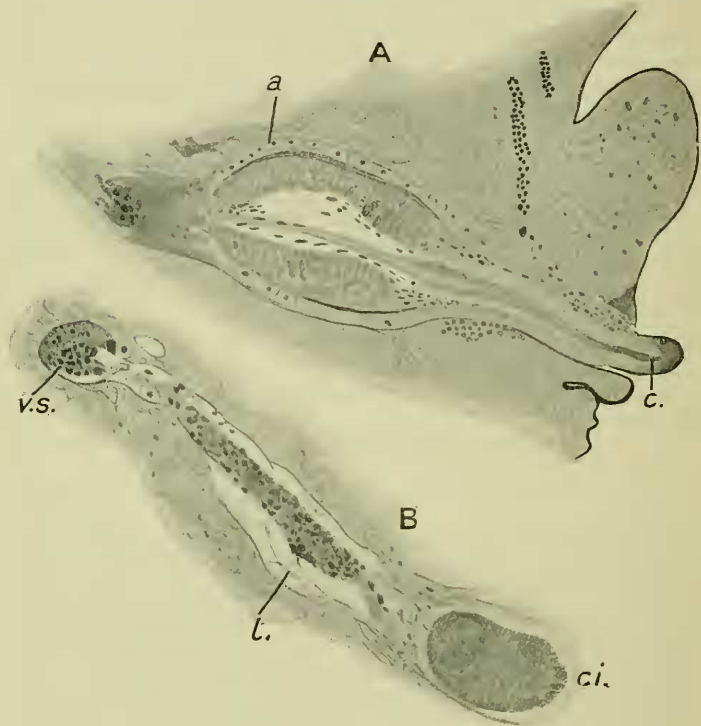
Furthermore, since the cirrus-sac passes to the same side of the two water-vascular tubes as that on which the testes lie, it has a dorsal position with regard to them; this point is not mentioned by Fuhrmann in his account of *Shipleya*. Moreover, as the transverse vessels arise from the ventral vessels they, too, are ventral in position, and therefore the female organs such as the receptaculum, which is more or less level with them, must be ventral. Fuhrmann states that in *Shipleya* the ovary is ventral. I have not been able to notice any ripe masses of spermatozoa in the testes, though there are many in the cirrus. This absence of sperm from the testes has already been noted by Fuhrmann in another genus.

The *vas deferens* of this worm is very remarkable. In the very young proglottids the vas deferens emerges from the cirrus-sac as a short and curved tube which is curved backwards towards the testes. In rather older proglottids the vas deferens is not much longer but is distinctly differentiated into two regions; there is a wider tube which emerges from the cirrus-sac and this abruptly becomes narrower in the distal region, where it ultimately breaks up into three or four branches for the supply of the testes. This differentiation of the vas deferens is much more highly developed in mature proglottids. The vas deferens after it emerges from the cirrus-sac runs forwards and inwards obliquely towards the anterior end of the segment, and that is away from the testes, which are posterior in position; this region of the vas deferens is that of the greater calibre, and the fine tube which issues from it is the sperm-duct proper and runs backwards towards the testes and thus at an acute angle with the anterior region. This is foreshadowed in the curved course of the entire vas deferens shown in the immature proglottids. To return to the anterior section of the vas deferens—this tube is very wide, relatively speaking, and often dilates at the ends, where it passes into the narrow section of the vas deferens, into a circular sac; its width varies in parts and according to the state of development of the segment.

The intimate structure of this region of the vas deferens is a

little difficult to make out. But it is clear that it forms a tube, slightly sinuous, which is walled by a layer of cells in which appear to lie masses of secretion, which masses are colloid in appearance and deeply stained by hæmatoxylin. They are found also within the tube, especially in its more dilated regions. These masses of secretion, as I suppose them to be, are shown

Text-figure 3.



Monacoccestus erethizontis.

A. Cirrus-sac in longitudinal section.

a. Its cellular sheath. *c.* Slightly produced cirrus.

B. Proximal end of vas deferens.

ci. Cirrus-sac. *l.* Longitudinal muscular fibres. *v.s.* Dilatation of vas deferens.

in text-fig. 3. The tubular character of this dilated region of the vas deferens is very obvious in the younger proglottids, where the cells of the tube have not become modified by the secretion spoken of. In parts, for instance, in the terminal dilatation

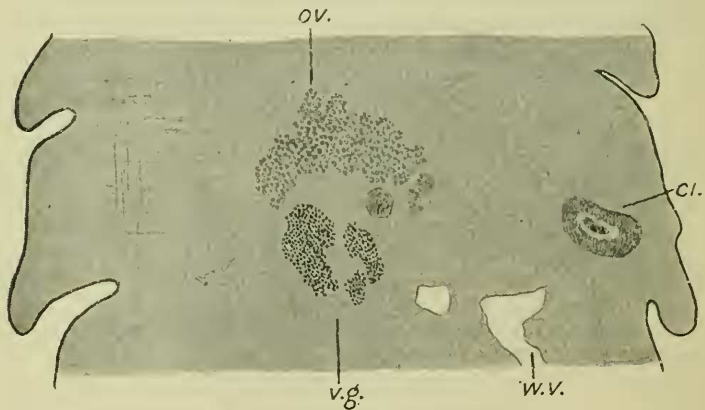
represented in text-fig. 3, the walls of the tube are thin but apparently still cellular. From this dilated extremity springs the fine and narrow distal region of the vas deferens, in which the actual walls are to be recognised with difficulty. These appearances suggest that we have to do here with an extremely exaggerated form of a vesicula seminalis, which possibly serves other purposes beside the mere storage of sperm: but as to what these functions are I have no reasons to form an opinion. It is, however, perhaps to be associated with the development of the sperm, which does not appear to come to maturity within the testes, as I have already pointed out. In all proglottids the dilated and glandular region of the vas deferens appeared to be full of sperm.

The *cirrus-sac* of this worm is large and reaches inwards across the two longitudinal tubes of the water-vascular system. It is perhaps half a millimetre in length. As already mentioned, the cirrus sacs alternate in position with absolute regularity in successive proglottids. Each cirrus-sac opens on to the exterior in mature segments rather behind the middle of the proglottid, and its position is oblique—the posterior end being directed anteriorly; the external aperture is thus directed rather backwards. I observed no individuals *in copula*, and it is difficult to understand how this takes place. In the case of other Acoleidae, which are all, like the present genus, without female orifices in the mature segments, it has been suggested that the spiny cirri perforate the body. Of any such spines there seems to be no trace in the present species. But frequently the cirrus within the sac was dilated with masses of sperm, conspicuous on account of its deeply staining with hæmatoxylin. The cirrus-sac projects into a fairly deep genital cloaca which is, in the most anterior segments where the cirrus-sac is immature, quite as deep as the cirrus-sac is long. The distinctiveness of the genital cloaca is rather lost in the mature proglottids. The cirrus-sac itself is oval in form, with a gradually decreasing anterior region which projects into the genital cloaca. It is, in fact, pear-shaped with rather a long stalk.

When the cirrus-sac is quite fully formed, it is seen to lie in a rather specialised region of the body parenchyma. This region is formed of very lax tissue, which might thus be supposed to allow of greater freedom on the part of the cirrus-sac. Moreover, isolated but numerous muscular fibres run inside and outside of this lax area which are attached to the cirrus-sac and probably serve as retractors. This lax area is not limited to the region occupied by the cirrus-sac alone; it runs back and accompanies the first part of the sperm-duct. In a series of sections the cirrus-sac and the first part of the sperm-duct are seen to lie loosely in the lax tissue which extends beyond it in every direction. The cirrus-sac is extremely muscular, the walls being unusually thick. The muscle-layers are two, the outside being of fibres having a longitudinal direction, and within this is a

much thicker layer of circular fibres. The inner layer is twice, or in parts thrice, the thickness of the outer layer. The inner circular layer ceases with the diminution in diameter of the cirrus-sac on its way to the exterior; the inner oval region is alone thus fortified. The outer muscular layer, however, continues to the distal extremity of the cirrus-sac and its narrower projection. Outside of these muscle-layers the cirrus-sac is enclosed within a single layer of rather large vesicular cells with a prominent nucleus. It appeared to me that this layer was continuous with the epithelium of the ensuing vas deferens, though special to the cirrus-sac in its peculiar structure. The cirrus-sac, as usual among the Cestodes, contains delicate muscular fibres and nuclei within it in addition to the cirrus. In the younger stages in the development of the cirrus-sac the sac has

Text-figure 4.

*Monococestus erethizontis.*

A proglottid viewed in its entirety, to show the position and shape of the ovary (*ov.*) and vitelline gland (*v.g.*).

ci. Cirrus-sac. *w.v.* Water-vascular tube.

more delicate walls in the rounded part of it, while the region leading to the genital cloaca has thicker muscular walls; the precise reverse occurs in the adult sac. The *cirrus* itself lies in a perfectly straight line in the adult cirrus-sac, and is of even calibre throughout when not distended with sperm; there is nothing in the nature of a vesicula seminalis within the cirrus-sac such as has been described in many forms. But when charged with sperm, dilatations are formed locally which are therefore to be regarded merely as local turgescences due to the enclosed sperm, and not, as representing a definite dilatation on the course of the duct, such as is the receptaculum upon the course of the vagina in this and other tapeworms. In

the younger and more spherical cirrus-sacs of earlier segments the cirrus is coiled. It perforates the muscle-layers of the cirrus-sac to become continuous with the vas deferens without any change of diameter.

The ovary of this worm is ventral in position, as in *Shipleya inermis*. In horizontal sections it forms with the vitelline gland almost a complete ring, since the ovary is semicircular and the smaller vitelline gland serves to close the semicircle posteriorly. The ovary is larger than the vitelline gland, and lies, of course, more anteriorly in the segment. In transverse sections the ovary is seen to possess a longitudinal and tubular form, the greater part of the cavity being empty. This is illustrated in text-fig. 2 (p. 1041). It is there seen to be pressed closely against the transverse muscular layer bounding the medulla, and thus to lie below the receptaculum seminis and also, to some extent, the vitelline gland. The remarkable tubular form of the ovary in young proglottids might lead to its being confused with the commencing uterus, which, however, lies above it and on a level with the receptaculum ovarum. The ovary has thus a flattened form when viewed in its entirety. It is near to the middle of the proglottid verging towards the pore side. The young cells, which will become ova, are chiefly massed at the two ends right and left of the tubular ovary, and this region, as shown in the figure referred to, is somewhat dilated on both sides, forming an oval sac. The course of the tube when viewed in transverse sections is quite straight from side to side.

§ *Vagina*.

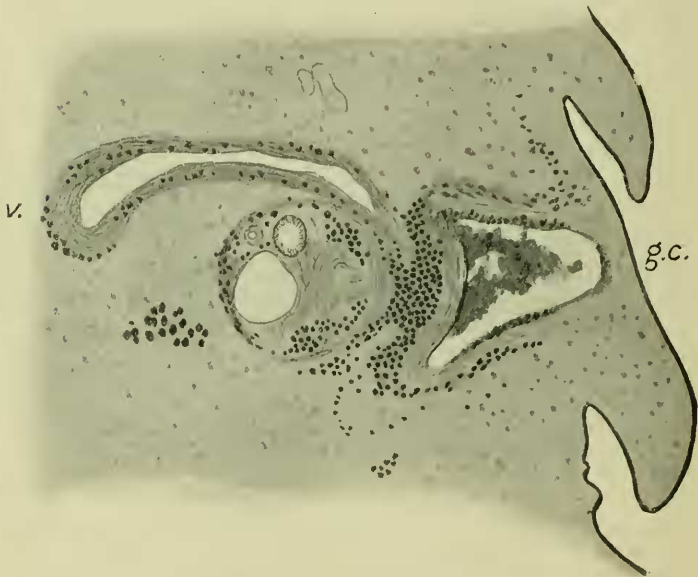
A careful inspection of the horizontal sections shows that, although no *vagina* opens into the so far isolated receptaculum seminis, the equivalent of a vagina would appear to be present. I cannot otherwise interpret a narrow straight duct which opens on to the exterior beside, and in front of, the cirrus-sac. This duct passes towards the interior of the body, up to a point on a level with the end of the outer half of the cirrus-sac; it is therefore of very limited extent. It ends at this spot in a dilatation, an oval sac. I have seen this tube ending blindly in a sac in four or five segments. There is thus no question of its normal presence; but I have seen it in the more anterior segments only, but which are nevertheless well provided with gonads, and a cirrus-sac as large as it is in the more posteriorly situated segments. The slender character of the duct and the delicate chamber into which it expands, remind me greatly of the conditions obtaining in my genus *Diplopylidium* *. But in the latter worm

* P. Z. S. 1913, p. 562. The illustration depicting the vagina of *Diplopylidium* (text-fig. 92, p. 563) may be compared with my description of the present species. In the text of that paper I have remarked that only in *Tetrabothrius* is this reversed position of pores. This is an obvious *lapsus calami* for *Tetradiscotyla*.

the small receptaculum passes posteriorly into a duct leading to the internal portion of the female apparatus. It seems to me to be impossible not to recognise in this tube a rudimentary vagina; but the dilatation can hardly be compared to a receptaculum, since that exists elsewhere.

In the first few proglottids of the worm, the female efferent apparatus is still more highly developed than in those proglottids which have just been considered. I find, in fact, in the first six or so of those proglottids in which the reproductive apparatus generally is recognisable in its details, that the vagina (text-fig. 5)

Text-figure 5.



Monacocestus crethizontis.

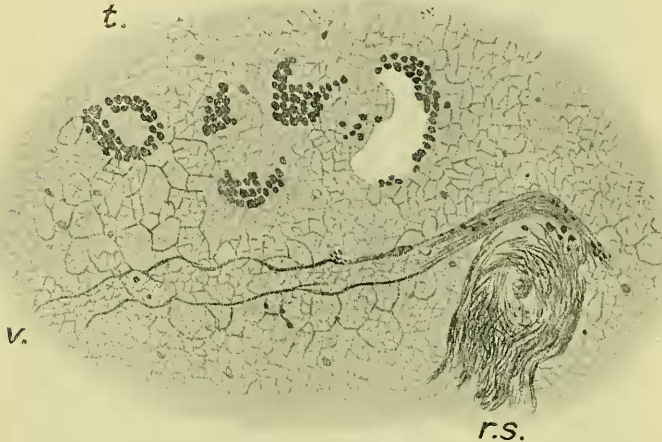
Part of a horizontal section through an anterior proglottid where the vagina (*v.*) has not commenced to disappear.

g.c. Genital cloaca.

is a wide thick-walled tube which opens on to the exterior close to, and in front of, the cirrus-sac on the one hand, and communicates with the receptaculum seminis on the other, thus forming a continuous female efferent apparatus, like that of more normal Cestodes. It is, perhaps, during this transient state that fertilization is effected, also in the normal way *viâ* this tube and not through the interstices of the body parenchyma. I have noted certain stages in the degeneration of the vagina; that part of it which opens into the receptaculum seminis persists, after it has

ceased to be a pervious duct, as a narrow tract of tissue blocked entirely by medullary parenchyma, but still retaining a definite wall (text-fig. 6) separating it from the surrounding parenchyma. As already mentioned, the external part of the duct persists longer as a pervious tube ending blindly and in a dilatation. This worm, therefore, is interesting as showing a transition between such a family as the Anoplocephalidæ and the Acoleidæ in point of its female efferent apparatus.

Text-figure 6.

*Monæcocestus erethizontis.*

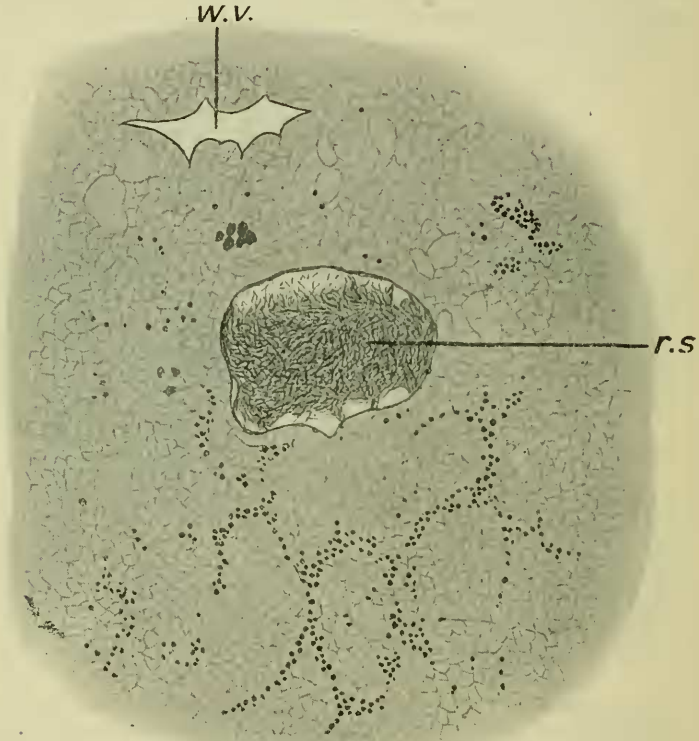
Part of a horizontal section through a proglottid a little further back than that referred to in text-fig. 5, to show degeneration of vagina (*v.*)

r.s. Receptaculum seminis. *t.* Testes.

The *uterus* of this worm is reticulate, except in very old proglottids in which a more complete fusion of the network tends to produce a saccular uterus. There are, however, even here, traces of the reticular condition. These may ultimately perhaps disappear. The uterus appears early in the body, and I have depicted it in young proglottids in text-figs. 7 & 8, which are respectively horizontal and transverse sections through young segments. A corresponding section (text-fig. 9) represents the mature uterus in subsequent segments. This organ is seen to lie quite medianly in the proglottid, that is to say, it is well above the ovary and in the same straight line with the receptaculum seminis. The ovary has disappeared in the more mature proglottids. The uterus at first forms a network of rather delicate strands which are abundantly nucleated but contain no lumen, or only a very narrow one. In transverse sections the lumen is quite visible in young proglottids, which are, however,

rather older than that depicted in text-fig. 8. The cavities appear in such a section to be detached, as the network is not so close as it becomes later. The cavities are lined with an epithelium which is at least less obvious in older uteri.

Text-figure 7.

*ut**Monæococystus erethizontis.*

Horizontal section illustrating the first appearance of the uterus (*ut.*).

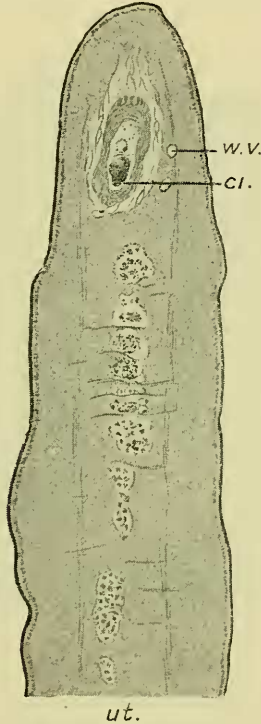
r.s. Receptaculum seminis. *w.v.* Water-vascular tube.

In all the sections referred to it may be seen that the uterus does not extend laterally beyond the trunks of the water-vascular system. The uterus is quite persistent, and is not replaced by anything of the nature of paruterine organs. The ripe eggs have a delicate shell, as appears to be the case in the Acoleidæ generally.

Naturally I have endeavoured to ascertain how far my species

resembles *Bertia* (now written *Bertiella*) *americana*, a species described by Stiles* from the same genus *Erethizon*, and previously assigned by the American helminthologist to the genus *Andrya*. This species, which is possibly, according to Stiles, identical with *Tenia laticephala* of Leidy†, is regarded by v. Janicki‡ to be identical with his *Schizotenia*.

Text-figure 8.

*Monacoccestus erethizontis.*

Transverse section showing the retiform uterus (*ut.*).

ci. Cirrus-sac. *w.v.* Water-vascular tube.

At first sight of the figures given by Stiles in explanation of this species, I was disposed to think that it might be identical with that which I describe in the present paper. For example, the male pores alternate with absolute regularity from right to left in segment to segment, and the very early development of

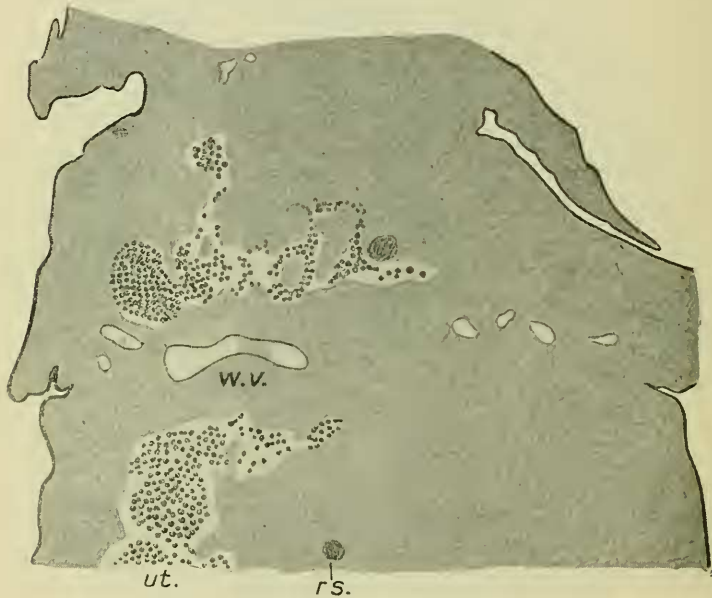
* Proc. U.S. Nat. Mus. xix, 1897, p. 165.

† Proc. Ac. Sci. Philad. 1855, p. 443.

‡ Zool. Anz. xxvii, 1904, p. 782.

the sexual organs is as in my species. The drawing* showing this alternation does not clearly represent the female ducts; but they are shown in a figure of a transverse section †. I infer them to be present in "*Bertiella americana*," though no particular and detailed mention of them is made in the text. The shape of the uterus, however, and the extreme narrowness of the segments, are sufficient to prevent any confusion between the two species. *Tenia pectinata*, described by Cobbold ‡ from the same animal, is

Text-figure 9.

*Monacoccestus erethizontis.*

Horizontal section showing the retiform uterus (*ut.*).

r.s. Receptaculum seminis. *w.v.* Water-vascular vessel.

too imperfectly known to permit of a comparison; moreover, it has unilateral genital pores, which are fatal to such a comparison.

The question may arise—are not my specimens perhaps abnormal? Von Janicki § has lately directed attention to two species of *Hymenolepis* in which the genital pores are absent; and at the same time Wolffhügel || has made similar observations upon a species of *Bertiella*. These facts are applied by v. Janicki

* Stiles, *loc. cit.* pl. x, fig. 7.

† Stiles, *loc. cit.* pl. x, fig. 9.

‡ Can. Nat. & Geol. vii, 1862, p. 394.

§ CB. Bakt. u. Paras. xxxvi, 1904, p. 222.

|| Berliner tierärztl. Wochenschr, 1904 (quoted by v. Janicki and Fuhrmann).

to Fuhrmann's genus *Aporina*, among the characters of which genus is the lack of these pores. Fuhrmann, however, has pointed out* that even if in the future examples of *Aporina alba* be met with in which the sexual ducts reach the exterior, the genus *Aporina* will not be invalidated thereby. I may use the same argument with regard to the species of Cestode which I describe in the present paper. But if I were compelled to ignore the rudimentary vagina, the genus would have to be placed in the subfamily Anoplocephalinae of the family Anoplocephalidae, though it would remain distinct.

Comparison with Shipleya inermis Fuhrmann.

Although at first sight, and indeed after some study, I was disposed to place the present species in the same genus as *Shipleya*, and even to consider the possibility of the two forms being identical, I am no longer able, after a more profound study of this species, to identify even generically the two forms referred to. It is remarkable, however, that in pursuing my supposed new species through the dichotomous table of Mr. Ransom I arrived at the genus *Shipleya*, the only difference apparently being the lack of spines upon the cirrus in my species. A reference to Fuhrmann's original description of *Shipleya inermis* shows, however, that there are other differences, and of importance. *Shipleya*, like other Acoleidae, has a body-wall which is traversed by a complicated series of muscles. Outside of the inner transverse muscles is a double row of large bundles; outside of this again are four separate and very thin layers of transverse fibres, between each of which is a layer of longitudinal fibres. Such a section is figured by Fuhrmann. In my species, on the other hand, there is but a single and the usual layer of transverse fibres, outside of which is a layer of singly disposed longitudinal fibres, an arrangement in marked contrast to that of *Shipleya*.

In the second place, although my species from *Erethizon* has a large cirrus-sac, this organ is not so large as in *Shipleya*, where it measures no less than one millimetre in length and is, furthermore, covered by diagonal fibres. In my species the fibres have the arrangement described above on p. 1045. There is, however, in both species the accurate alternation in the position of the genital apertures. But we shall see directly that another tapeworm, more probably allied to my species, shows the same regular alternation of these pores from right to left side of the body. I do not think it likely that I have failed to see the spines upon the cirrus if they were really present and like those of *Shipleya*; for Fuhrmann described these spines as arranged in three rows and very like the thorny spines of the Acanthocephala. I have seen nothing of the kind, though the cuticle covering the organ is composed of almost separate rod-like spinules. These, however, are closely set and in contact,

* Zool. Jahrb., Suppl.-Bd. x. 1908, p. 39.

and cannot be compared with spines such as I infer to exist in *Shipleya*. The last-mentioned genus does not appear to possess testes in the same segments as those which contain the ripe female sexual products; Fuhrmann did not see those gonads but presumed that they were to be found in earlier segments. Now in my species the testes are obvious and numerous in very many segments. Prof. Fuhrmann, with his experience of the structure of Cestodes, could not have missed them were they so plentifully present in *Shipleya inermis*. This is a most important difference between the two forms, and one which marks out the genus *Shipleya* as having retained to some extent the dioecious nature of its ally *Dicoccestus*. There is no trace of such a state of affairs in my species. It is doubtless of minor importance to point out that the receptaculum in *Shipleya* has a crenate outline and is a small sac, while in my species it is rather large and of circular contour. Also the vitelline gland of my species is displayed in the same horizontal section with the ovary, and therefore does not lie entirely dorsal to it, as is stated to be the case in *Shipleya*. Finally, it is rather remarkable that there should be so close a likeness between the uterus in the two forms. It has in both a nearly annular shape, being incomplete however on one side. The uterus persists in both species, and is not replaced by anything in the nature of a paruterine organ. This fact, coupled with the character of the female generative system, leads me to place my species in the neighbourhood of this genus *Shipleya*, but other details of anatomy forbid their reference to the same genus.

The species described in this paper therefore differs from *Shipleya* in the following assemblage of characters:—

- (1) *The muscular layers of the body-wall are feeble.*
- (2) *There are no papillæ on the scolex and no apical depression.*
- (3) *The water-vascular tubes have no ramifications.*
- (4) *The testes are numerous in all segments until those in which the uterus is developed, and form rows right across the proglottids.*
- (5) *Although the vagina comes to be aborted it is fully developed in the most anterior segments, and there are traces of the terminal part for some way back in the shape of a sac opening on to the exterior in front of the cirrus.*
- (6) *The cirrus has no spines upon it.*
- (7) *The uterus forms a network.*
- (8) *The vas deferens is dilated into a vesicula seminalis of peculiar form.*

As the definitions of genera among the Cestoidea go, these characters are, as it appears to me, quite sufficient to allow of generic separation. They are also accompanied by a few minor differences, such as the form of the receptaculum seminis, and also by some minor points of likeness, such as size and absence of neck and regular alternation in genital pores.

The following characters will define the new genus, and the name will suggest its affinity with the Acoleidæ:—

MONÆCOCESTUS, gen. nov.

Scolex unarmed; proglottids not longer than broad. Genital pores regularly alternating. Water-vascular tubes two pairs lying side by side, connected by transverse vessel from inner tubes in each proglottid; no network. Longitudinal muscles feebly developed, without bundles. Generative organs visible in first or second proglottid; first genital pore in segment 6. Testes numerous in transverse rows posteriorly, within area bounded by water-vessels; sperm-duct at first very wide and covered by glandular cells, after this short and narrow, without coil or vesicula seminalis; cirrus-sac large and very muscular, cirrus unarmed. Ovary curved in front of smaller vitelline gland. Vagina present in a few early segments, later aborted, with exception of spherical receptaculum seminis. Uterus retiform, meshwork later tending to confluence. Eggs with delicate shell.

For the present the above definition will have also to serve for the new species, which I call *Monæcocestus erethizontis*, sp. n.